



## PROPOSED TEST BORING LOCATIONS

## PROJECT STATEMENT

THE PROJECT CONSISTS OF THE REPAIR AND RESTORATION OF THE EXISTING WOOD PILES THAT SUPPORT THE PIER AND BUILDINGS, I.E. THE FOUNDATION PILES. THE PIER WAS CONSTRUCTED APPROXIMATELY 150 YEARS AGO. SEVERAL ADDITIONS AND REPAIRS HAVE BEEN MADE. THE PURPOSE OF THE RESTORATION AND REPAIRS IS TO RESTORE THE PILE'S ORIGINAL CAPACITY.

IN THE PIERS CURRENT CONDITION MOST OF THE PILES HAVE BEEN CUT OFF NEAR THE WATERLINE, PLANKS PLACED OVER THEM AND SHORT SECTIONS OF TIMBER PILE (BLOCKING) HAVE BEEN PLACED ABOVE THE PLANKS. IN MOST CASES THE BLOCKING APPEARS TO BE CENTERED OVER THE CUTOFF PILES. THE PLANKS AND BLOCKING ARE AFFIXED TO THE CUTOFF PILES AND OVERLYING BEAMS WITH A METAL SPIKE OR NAIL. IN MOST CASES A SINGLE SPIKE OR NAIL APPEARS TO HAVE BEEN USED.

IN ITS CURRENT STATE, THE PIER IS VULNERABLE TO DAMAGE PRIMARILY ICE, BOATS AND SHIPS WHICH POTENTIALLY PLACES LARGE HORIZONTAL FORCES ON PORTIONS OF THE PIER. IN ADDITION, ICE ABRADES THE TIMBER, REDUCING ITS CROSS SECTION AND OVERALL CAPACITY. IN SOME LOCATIONS THE UPPER PORTION OF THE PILES ARE MISSING AND GAPS ARE PRESENT IN THE ROWS OF PILES. FORTUNATELY THE BEAMS HAVE THE CAPACITY TO SPAN THE GAP IN MOST CASES. HOWEVER, THE CAPACITY OF THE BEAM IS AT ITS LIMIT IN THIS CASE.

THE EXISTING CONNECTION BETWEEN THE BLOCKING, PLANKS AND PILES HAS LESS CAPACITY THE A NEW PILE TO RESIST SHEAR AND BENDING FORCES. WHERE THE BLOCKING IS OFF CENTER OVER THE PILES THE AXIAL CAPACITY IS REDUCED.

THE DENSO SYSTEM WILL BE USED CREATE A CONNECTION BETWEEN THE BLOCKING AND EXISTING PILE THAT EQUALS OR EXCEEDS THE BENDING AND SHEAR CAPACITY OF THE ORIGINAL TIMBER PILE. IN ADDITION THE DENSO SYSTEM WILL BE USED TO ENLARGE THE PILE CROSS SECTION TO RESTORE THE PILES AXIAL CAPACITY.

THE DENSO SYSTEM CONSISTS OF A FABRIC JACKET THAT IS WRAPPED AROUND A SECTION OF THE PILE AND THE ANNULUS BETWEEN THE JACKET AND PILE IS FILLED WITH CEMENT GROUT. A MAT OF CARBON FIBER IS ENCAPSULATED IN THE GROUT. THE COMBINATION OF THE STRENGTH OF THE CARBON FIBER AND GROUT INCREASES THE STRENGTH OF THE PILE.

RELEASE DATES		
7-26-24	PERMIT / CONSTRUCTION	
 SOILS & STRUCTURES		
6480 Grand Haven Road Muskegon, Michigan 49441 (800) 933-3959 Fax (231) 798-1383		
CLIENT:		
		
587 North State Street St. Ignace, Michigan 49781 800-638-9892		
PROJECT:		
MAIN PIER REPAIRS MACKINAC ISLAND CITY OF MACKINAC ISLAND MACKINAC COUNTY MICHIGAN		
Drawn by: D. HOHMEYER, P.E.	Date: 5-28-24	
Checked by: D. HOHMEYER, P.E.	Date: 5-28-24	
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